

CLAIMS

What is claimed is:

1. An elongated hollow body of arbitrary length and cross-section comprising, a poly(C<sub>2</sub>-C<sub>4</sub>)olefinic outer layer and a tubular core; the tubular core being coextensive with  
5 essentially the entire length of the body, the outer layer bonded to the tubular core comprising a chlorinated lower polyolefin selected from the group consisting of a randomly chlorinated polyolefin (r-CPO), a partially randomly chlorinated polyolefin (pr-CPO) and a blocky chlorinated polyolefin (b-CPO), wherein the lower olefin has from 2 to 4 carbon  
10 atoms and the chlorine content of the tubular core is in the range from 5 to about 50 percent by weight.
2. The hollow body of claim 1 is a twin-layered pipe, the polyolefinic outer layer is cross-linked polyethylene, and the tubular core is of a polymer selected from the group consisting of a randomly chlorinated polyethylene (r-CPE), a partially randomly  
15 chlorinated polyethylene (pr-CPE) and a blocky chlorinated polyethylene (b-CPE).
3. The twin-layered pipe of claim 1 wherein the chlorinated lower polyolefin is blocky chlorinated polyolefin is present in a major proportion by weight relative to a blending ingredient in the blocky chlorinated polyolefin, and the blending ingredient is  
20 selected from the group consisting of a poly(lower-olefin) rubber, lower-olefin-diene elastomer, poly(vinyl chloride), processing aid, stabilizer, impact modifier, inert filler, and pigment.
4. The twin-layered pipe of claim 3 wherein the blending ingredient in the  
25 tubular core is present in an amount in the range from about 1% to 20% by weight based on the combined weight of compounds in the tubular core.
5. The twin-layered pipe of claim 4 wherein the polyolefin rubber is selected from the group consisting of (i) polymerized lower (C<sub>2</sub> - C<sub>4</sub>) monoolefins and (ii)

polymerized lower ( $C_2$  -  $C_4$ ) monoolefins and a diene, present in an amount in the range from about 1% to 10% by weight.

5           6.       The twin-layered pipe of claim 1 wherein the tubular core has a wall thickness, measured in the radial direction, in the range from 0.025 mm to 0.5 mm and the wall thickness of the outer layer is essentially the same as the nominal wall thickness of conventional poly(lower)olefinic pipe having the same nominal diameter.

10           7.       The twin-layered pipe of claim 2 having a nominal diameter in the range from in the range from about 7 mm (0.25 in) to about 152 mm (6 in) and a wall thickness in the range from about 1.57 mm (0.062 in) to about 17 mm (0.681 in).

15           8.       The twin-layered pipe of claim 7 wherein the outer layer is cross-linked polyethylene (PEX) and the tubular core is of a polymer selected from the group consisting of a randomly chlorinated polyethylene (r-CPE), a partially randomly chlorinated polyethylene (pr-CPE) and a blocky chlorinated polyethylene (b-CPE).

20           9.       The twin-layered pipe of claim 8 wherein the tubular core is of a blocky chlorinated polyethylene (b-CPE) having (i) a melting temperature in the range from about 110°C to about 140°C measured by differential scanning calorimetry, and (ii) an amorphous phase and a crystalline phase wherein the chlorinated polyethylene contains from about 15% to about 50 weight percent bound chlorine, based on the weight of the chlorinated polyethylene.

25           10.      The twin-layered pipe of claim 8 wherein the tubular core has a wall thickness such that mechanical properties of the pipe are substantially indistinguishable from those of conventional PEX pipe, and the flexural modulus of the pipe is no more than 20% greater than the flexural modulus of PEX.

11. The twin-layered pipe of claim 8 including, in addition, a third layer of poly(lower)olefin directly cohesively bonded to the cross-linked polyethylene layer's outer surface to form a tri-layered pipe.

5           12. The twin-layered pipe of claim 7 including a third layer of a poly(lower)-olefin wherein the outer layer of poly(lower)olefin and the third layer are bonded in any relative order with respect to the tubular core.

10           13. An elongated hollow body of arbitrary length and cross-section comprising, a poly(lower)olefinic outer layer and an tubular core with an intermediate layer therebetween; the tubular core and intermediate layer being coextensive with essentially the entire length of the body, the poly(lower)olefinic layer bonded to the intermediate layer which, in turn, is bonded to the tubular core; the intermediate layer comprising a polymeric adhesive, the tubular core comprising a chlorinated lower polyolefin selected from the group  
15           consisting of a randomly chlorinated polyolefin (r-CPO), a partially randomly chlorinated polyolefin (pr-CPO) and a blocky chlorinated polyolefin (b-CPO), wherein the lower olefin has from 2 to 4 carbon atoms.

20           14. The hollow body of claim 13 wherein the adhesive layer is a graft copolymer selected from the group consisting of a lower polyolefin and vinyl acetate having an active stub selected from the group consisting of an unsaturated carboxylic acid and a derivative thereof.

25           15. The hollow body of claim 13 wherein the lower polyolefin is selected from the group consisting of polyethylene (LLDPE, MDPE or HDPE) and polypropylene, and the active stub is selected from the group consisting of extrudable polymer selected from the group consisting of acrylic acid, methacrylic acid, maleic acid, dicarboxylic acid, halides, amides, imides, anhydrides or esters thereof.

16. A method of forming an elongated hollow body of arbitrary length and cross-section comprising, extruding a tubular core of chlorinated lower polyolefin at a first mean temperature in the range from about 150°C to 225°C, the chlorinated lower olefin being selected from the group consisting of a randomly chlorinated polyolefin (r-CPO), a partially  
5 randomly chlorinated polyolefin (pr-CPO) and a blocky chlorinated polyolefin (b-CPO), wherein the lower olefin has from 2 to 4 carbon atoms; co-extruding a poly(lower)olefinic outer layer co-extensively with the tubular core of chlorinated lower polyolefin at a second mean temperature in the range from about 150°C to 250°C above the first mean temperature; and, removing a co-extrudate having the outer layer cohesively bonded to the tubular core.